

Native Plant Diversity Restoration:
Non-Native Invasive Species (NNIS) treatments and
planting native species across Salem and Potosi-
Fredericktown Ranger Districts on the Mark Twain
National Forest



Mark Twain National Forest
Natural Resource Damage Assessment
Restoration Proposal

May 2015
Updated 12/22/2015

Restoration Project Information Sheet

General Information

Organization: US Forest Service, Mark Twain National Forest

Date Submitted: May 18, 2015

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Project Information

Type of project: NNIS (Non- Native Invasive Species) mapping, eradication, and control, followed by planting of native species to enhance habitat quality.

Project name: Native Plant Diversity Restoration: Non-Native Invasive Species (NNIS) treatments and planting native species across Salem and Potosi-Fredericktown Ranger Districts on the Mark Twain National Forest

Location: Zone 1 (Salem and Potosi-Fredericktown Ranger Districts)

Counties: Dent, Washington, Iron, Reynold, Crawford,

Watersheds: Big, Meramec, and Upper Black

Project size:

Total acres to treat (already inventoried): 4,693 acres

Total acres to map/inventory and treat: 8,932 mapped/4,466 treated acres

Treatment price \$70/acre, while map/inventory and treat one half the acres averages \$50/acre

Introduction and Background

The federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorizes claims for “damages for injury to, destruction of, or loss of natural resources” as a result of the release of a hazardous substance [42 U.S.C § 9607(a)(4)(C)]. Any compensation received as a result of resolving a claim for natural resource damages must be used for “the restoration, rehabilitation, or replacement or acquisition of the equivalent of” any lost natural resources or their services [42 U.S.C. § 9611(i)]. This CERCLA process is referred to as natural resource damage assessment and restoration (NRDAR) the goal of which is to compensate the public for the loss of resources and their services resulting from a release of a hazardous substance.

Missouri Trustees and the Trustee Council

CERCLA, and its implementing regulations, designated federal and state authorities to act on behalf of the public as trustees for natural resources, including supporting ecosystems, belonging to, managed by, controlled by, or appertaining to such state, or by the United States. [42 U.S.C. § 9607(f); 40 C.F.R. § 600 and § 300.605]. Under this authority, the Governor of the State of Missouri has appointed the director of the Missouri Department of Natural Resources (MDNR) as the designated state trustee. The U.S. Fish and Wildlife Service (FWS) is acting as the trustee on behalf of the U.S. Department of the Interior, and the U.S. Forest Service is acting as Trustee on behalf of the U.S. Department of Agriculture in the Southeast Missouri Lead Mining District (SEMOLMD, collectively “Trustees”). The Trustees formed a Trustee Council by a [Memorandum of Understanding](#) and [Addendum A](#). The Trustee Council coordinates activities for both assessing injuries to natural resources and their services and the restoration, replacement, rehabilitation, or acquisition of the equivalent of the lost natural resources and their services upon receipt of compensation from potentially responsible parties.

Restoration Plan

Pursuant to CERCLA, the Trustees developed the Southeast Missouri Ozarks Regional Restoration Plan (SEMORRP) which provides a process framework that governs the approach for restoration project identification, evaluation, selection and implementation [42 U.S.C. § 9611(i)]. The SEMORRP is available at: <http://www.fws.gov/midwest/es/ec/nrda/SEMONRDA/pdf/SEMOfinalRestorationPlanJune2014.pdf>. As part of the restoration process, an agency member of the Trustee Council may submit proposal(s) for restoration projects to be evaluated by the larger Trustee Council in accordance with the factors discussed in the SEMORRP.

Connection to the Injured Resources

This project is for the control and eradication of non-native invasive species (NNIS), and it will restore habitat that is substantially similar to or the same as habitat that has been injured in the Viburnum Trend Lead Mining Area. Restoration of terrestrial habitat will support a wide range

of habitat, from soil invertebrate to migratory birds. Decreased floristic quality due to NNIS and other impairments from the heavy metals have negatively impacted habitat conditions for migratory birds and other fauna. By focusing on NNIS control and eradication, we will be increasing the floristic quality in the project area. Restoration of high-quality vegetative communities, with high floristic quality, will act as a supporting ecosystem for migratory birds and other animals.

Project Proposal

In its role as a Trustee, the Forest Service submits the following restoration project proposal to the Missouri Trustee Council. The proposed restoration action is to eradicate and control NNIS across the area as a means to restore, rehabilitate, or replace or acquire the equivalent of natural resources and their services lost at the Viburnum Trend. The project location is on the Mark Twain National Forest (MTNF).

Project Description

The goal of this proposal is simple, but important: Eradicate or control all target NNIS within the project boundaries. By controlling and eradicating NNIS, we will be increasing the floristic quality and habitat and ecosystem resources. NNIS management is a critical component of any restoration work and should be fully integrated into all other project proposals. Unfortunately, due to budget and staff constraints, there has been limited inventory, treatment and monitoring done of NNIS in the project boundaries.

Currently the Salem and Potosi Ranger Districts have 9,385 infested acres mapped and inventoried (Table 1) in the project area (Map 4). This represents a small percentage of the actual acres infested by non-native and invasive plants that pose a threat to health and integrity of native plant communities across these two Ranger Districts (Table 2).

The Forest seeks funding for a variety of treatment methods required to control, reduce and/or eradicate 50% of the existing mapped and inventoried infestation acres located in portions of the Meramec, Upper Black and Big River Watersheds that fall within the Salem and Potosi Ranger Districts. There are a total of 9,385 inventoried acres, and so in targeting 50% of those acres we plan to **treat 4,693 acres** of high-priority habitat. Most of the infestations pose threats to high quality, un-infested natural communities. Many of the inventoried acres are roads, trails, and right-of-ways that serve as entry points for invasive species onto the national forest. Control of invasive species at these points of entry is particularly important to protecting the floristic composition/integrity of the Forest. These treatments would be accomplished through a combination of contracted work and Forest Service personnel.

The Forest seeks additional funding to complete NNIP **mapping and inventory, and treatment** on an additional **8,932 acres** focused primarily in the Upper Black Watershed, where the Forest is lacking in adequate inventory.

After control of NNIP, a **native plant seed mix** will be applied to heavily treated areas to promote the growth and colonization of native plant species.

Table 1: Acres of inventoried non-native invasive plant species by watershed

Non-native invasive plant type	Acres inventoried and ready for treatment		
	Meramec (HUC 8)	Big River Watershed	Upper Black Watershed
autumn olive		0.6	
cheatgrass	5.5	7.6	
Chinese lespedeza	3,139.9	218.3	496
common viper's bugloss	0.2		
cutleaf teasel	5.5		
garlic mustard	0.7		
Japanese honeysuckle	178.1		
multiflora rose	2,787.6	239.4	362
Nepalese browntop	0.3		
nodding plumeless thistle	1,172.8		152
sericea lespedeza	33.9	80.3	3
silktree			1
spotted knapweed	93.3	3.5	
tree of heaven	395.2	8.2	
Total: 9,385 acres	7,813	558	1,014

The Forest has identified priority areas for invasive species inventory and management (Table 2). These include the Mark Twain National Forest restoration management areas (MA 1.1 and 1.2), Wilderness areas, State Designated Natural Areas, developed and dispersed recreation areas, designated trails and associated trailheads, riparian management zones and other priority areas (refer to Map 2). Within the project area is Grasshopper Hollow Natural Area which contains fens and which is critical habitat for Federally Threatened and Endangered species. Protecting Grasshopper Hollow Natural Area and other priority areas from invasive plant species requires early detection and rapid response to any new infestations as well as treatment of long established infestations; many of which have not been addressed due to a lack of funding and resources. By having the right specialists and additional available funding, an under-evaluated and under-treated area would be prioritized for treatment and restoration work.

Table 2: Current priority areas for NNIS management on the Salem and Potosi-Fredericktown Ranger Districts

Prevention Zones	Acres
Campgrounds	275
Developed Recreation Areas	5,543
Dispersed Recreation Areas	2,571
Designated State Natural Areas	490
Priority Forest Plan Management Areas	201,376
Recreational Points	10
Riparian Management Zones	10,899
Trails	632
Trailheads	64
Wilderness Areas	9,143
Total	231,000

The project areas cover much of Zone 1 (Salem and Potosi-Fredericktown Ranger Districts) on the MTNF. By addressing the issue of NNIS on a large scale, we will be able to positively impact and improve habitat on a landscape scale.

This area is part of the Ozark Highlands, and specifically, the St. Francois Knobs and Basin and the Current River Hills. The area is characterized by rolling plains and steep hills of dolomite, sandstone, and limestone. There are abundant numbers of springs, seeps, and caves within the karst topography. The project area crosses the Big, Meramec, and Upper Black watersheds. Dominant vegetation includes oak-hickory and pine-oak woodlands, oak savannahs, prairies, glades and bottomland forests. These vegetative communities have been reduced from their historical levels of dominance by development and land use. They support unique and distinct plant communities. The soils are old, highly weathered, and often rocky.

Within the project area are species of both state and Federal concern, including the Hine's Emerald Dragonfly (*Somatochlora hineana*) and multiple *Myotis* species, including *M. grisescens*, *M. sodalis*, and *M. septentrionalis*. The Hine's Emerald Dragonfly lives in fens and is very sensitive to changes in landscape. The habitats that these creatures utilize are being taxed by NNIS invasion. Treating the NNIS populations within the project area will help to improve habitat for these federally threatened and endangered species.

The Mark Twain National Forest has drastically increased its effort to address non-native and invasive plant species by completing a Forest-wide Environmental Impact Statement (EIS) and

Record of Decision which allows the Forest to treat all existing and future NNIP infestations. In addition, the Forest has hired three Natural Resource Managers with the responsibility to focus on the control and eradication of invasive plant species and the protection, enhancement and restoration of native plant communities. The Forest currently allocates approximately \$200,000 annually toward invasive inventory, monitoring and treatment across all of the Ranger Districts of the Mark Twain National Forest. This is an inadequate amount of funding to address the threats posed by NNIP to the Mark Twain National Forest and funding from outside sources would greatly enhance the Forest's ability to address these threats.

This project approved under the EIS proposes to map and survey existing exotic and invasive populations, treat those populations by mechanical and/or chemical means, and monitor populations for treatment effectiveness. The proposed project timeline is five years, despite the fact that there will need to be additional work completed outside of the five year time frame. During the first two years, the priority will be to survey and inventory the project area for target NNIS populations. The Forest currently has contracts in place to address a variety of physical, mechanical and chemical treatments. The Forest has contracts to conduct NNIP and Botanical Surveys and will coordinate contracting for intensive botany surveys of the proposed project area, so that we can have good baseline botany data. During the subsequent years, the goal will be to focus on treatment for new and emergent populations of NNIS via IDIQ contract. Biannual monitoring will follow treatment and continued survey and inventorying will accompany all work. Retreatment will be necessary to maximize control. With continued control and eradication, the replanting or reseedling of native plants restore the landscape will be added into the project timeline.

Project Benefits

This proposed project is right in the heart of the Viburnum Trend area. Zone 1 (Salem and Potosi-Fredericktown Ranger Districts) are in the midst of this area and all management work will focus on this area. By focusing on this large area, we will be able to improve habitat and ecosystem process across the landscape. Decreased floristic quality due to NNIS and other impairments from the heavy metals have negatively impacted habitat conditions for migratory birds and other fauna. By focusing on NNIS control and eradication, we will be increasing the floristic quality across the counties and the three major watersheds. By doing so, we will be improving habitat conditions and native plant communities. Improved vegetative site conditions will also hopefully improve wildlife corridors and habitat.

Watershed improvements benefit both the Forest Service and all other partners and land managers that the watershed drains to. Due to the complex nature of watershed scale restoration work, it may be in the public's best interest to form Cooperative Weed Management Agencies (CWMAs) with other land managers and private parties to jointly inventory, treat, and manage shared resources as it relates to NNIS work.

The MTNF is uniquely qualified to take on and manage a project of this nature. The Forest has specialists on staff that develop, plan and execute land and resource management, and restoration activities as part of MTNF operations. The MTNF has staff, expertise, history of success with restoration work, and public accountability through NEPA. The project proposed here is consistent with the mission of the Forest Service of caring for the land.

Proposed Budget

The Forest seeks funding for a variety of treatment methods required to control, reduce and/or eradicate 50% of the existing mapped and inventoried infestation located in portions of the Meramec, Upper Black and Big River Watersheds that fall within the Salem and Potosi Ranger Districts. There are a total of 9,385 inventoried acres, and so in targeting 50% of those acres we plan to treat **4,693 acres** of high-priority habitat. These treatments would be accomplished through a combination of contracted work and Forest Service personnel. Average estimated cost is \$70 per acre.

The Forest seeks additional funding to complete NNIP mapping and inventory, and treatment on an additional 8,932 acres focused primarily in the Upper Black Watershed, where the Forest is lacking in adequate inventory.

Budget Details*

Costs description	Unit cost	Amount	Total
NNIP Treatments existing inventoried infestations identified as high priority	\$70/acre	4,693 acres	\$328,510
NNIP Survey for Black and Big River Watersheds	\$50/acre [Survey costs are \$15/acre. We assume 50% of surveyed acres will need treatment at \$70/acre, so that the average cost per acre is \$15+ (\$70 * 50%)]	8,932 acres	\$446,600

Native Plant Material Native Seed Mix for rehabilitation in heavily treated area.	\$75/lb	100 acres @ 5lbs/acre	\$37,500
		Total	\$812,610

*U.S. Forest Service has and will provide matching funding for this project in the form of employee salaries for surveys, implementation, contract administration, and project oversight. Forest Service is contributing both the overhead portion of all employee costs to this project and direct personnel costs, including follow-on biannual monitoring.

Project Partners

When available, AmeriCorps crews or VetsWork interns on the Zone will be incorporated into the work. They may be utilized on the project by assisting with mapping exotic/invasive populations, removing plants via cutting or pulling, applying herbicide under the supervision of a certified pesticide applicator, or monitoring populations for treatment effectiveness.

Forest service will investigate public's interest in forming Cooperative Weed Management Agencies (CWMA) with other land managers and private parties to jointly inventory, treat, and manage shared resources as it relates to NNIS work as appropriate.

Maintenance Requirements

This project proposal requires that NNIS populations receive multiple treatments over the next five years. It will be necessary to treat the populations repeatedly over five years for maximum control. Treated populations will be monitored biannually to determine effectiveness of treatment and prioritization for the following year.

It may be necessary to treat the populations outside the five year project window. If this is necessary, monitoring will also need to follow.

Compliance with Applicable Laws and Regulations

Herbicide will only be applied by state certified applicators or under the supervision of state certified applicator(s).

Herbicide will be used in compliance with the Mark Twain National Forest NNIP (Non-native invasive plants) EIS.

The Mark Twain National Forest Plan will be followed as it relates to prioritization of certain NNIS species on the Forest. Spotted knapweed, Asian honeysuckle, and Japanese stilt grass are

the priority populations for FY15 Forest-wide.

All Forest employees, contractors and partners who use chain saws or other mechanical equipment for NNIS eradication will be properly trained before usage.

Due to the presence of Hine's Emerald Dragonfly (*Somatochlora hineana*) and multiple *Myotis* species, including *M. grisescens*, *M. sodalis*, and *M. septentrionalis*, the Threatened and Endangered Species Act will be followed and adhered to.

Timeline

This project is assuming a five year time frame for inventorying and survey, treatment, monitoring and retreatment of NNIS. All NNIS populations within the boundaries may not be completely eradicated within five years. NNIS eradication and control is an ongoing challenge that is complicated by time, budget, and various vector factors. The Forest will continue to make NNIS eradication a priority and work will continue for years to come. As eradication and control continue, it will be more feasible to focus on habitat restoration and restoring ecosystems.

FY15: During the first year, the priority will be to survey and inventory the project area for target NNIS populations. Additionally, we will continue to focus on writing IDIQ contract task orders in order to get the population under contract for treatment for late FY15 or FY16. We will also contract intensive botany surveys of the proposed project areas, so that we can have good baseline botany data.

FY16: The goal will be to focus on treatment for new and emergent populations of NNIS. Monitoring will follow treatment. Continued survey and inventory will accompany all work.

FY17: The goal will be to retreat populations from FY16 to maximize control. Focus on writing IDIQ contracts for work for FY17 and FY 18. Monitoring will follow treatment to assess effectiveness. Continued survey and inventory will accompany all work.

FY18 and beyond: Continue with monitoring, inventory and survey for emergent populations, and treatment or retreatment. Habitat restoration and planting of native plants or native seeds as necessary to restore the landscape.

Permanence

The Land and Resource Management Plan of the Mark Twain National Forest guides all natural resource management activities. The Forest Plan establishes goals and objectives for the forest, and sets out forest-wide standards and guidelines for management activities. The newly restored/protected habitat from this project will be guided by the Forest Plan. All land management actions taken by the MTNF are subject to the Forest Plan and the NEPA Process which includes public involvement. Special designations or management requirements, or incorporation into, for example, Wilderness Areas function through the Forest Plan.

Measures of Success

Monitoring will be a necessary step to measure the successfulness of the NNIS treatments in the project area. All NNIS treatments across the Forest are monitored for effectiveness. Biannual monitoring will be a critical component of measuring success. Annual inventory and surveying for new or emergent populations will also help to ensure that treatments are effective in controlling NNIS. We will expect that monitoring will show that populations are being eradicated or controlled and that native species are thriving to be considered a positive result.

It may not be possible to completely eradicate large and pervasive NNIS populations. For those populations, it may be more reasonable to control those populations to a level that does not compromise the integrity of the ecosystem and still allows for native species to thrive. New and emergent populations may be easier to eradicate, especially with continued inventory and early detection.







